

IN THE SPECIFICATION:

Please amend the title as follows: --A CAMERA CONTROL SYSTEM
THAT CONTROLS A PLURALITY OF LINKED CAMERAS--

Please amend the paragraph at page 1, lines 8 to 15 as follows:

--The present invention relates to a camera control system, a camera control method, a camera control server, a camera apparatus, a user interface apparatus, and the like for distributing an image via a computer network, such as the Internet, an Intranet or the like. More particularly, the invention relates to an improvement in a operation of a video camera installed at a remote location in image distribution service.--

Please amend the paragraph at page 1, lines 18 to 23 as follows:

--Recently, in accordance with diffusion the spread of computer networks, such as the Internet, Intranet Intranets and the like, “remote apparatus service systems” which allow the user to operate a peripheral apparatus, such as a printer, a scanner or the like, installed at a remote location via a computer network have been produced more and more produced.--

Please amend the paragraph from page 1, line 24 to page 2, line 5 as follows:

--A “remote camera system” is one such system of such systems. In the In a remote camera system, an image from a video camera intalled installed at a remote location can be seen at any location in the world via a computer network. Such In such a remote camera system has features that not only can an image from a camera can be seen, but

also the orientation or the zooming magnification of the camera can be operated from a remote location.--

Please amend the paragraph from page 2, line 18 to page 3, line 1 as follows:

--The main function of the remote camera system is provided by the camera control module 204. In FIG. 1, the camera control module 204 can be realized by means of any hardware. Usually, however, the camera control module 204 is mounted as software in an ordinary personal computer (hereinafter abbreviated as a "PC"). In such step a case, the video camera is connected to the PC by means, a communication means such as RS232C or the like. In a conventional approach, the camera control module 204 is integrated with the video camera.--

Please amend the paragraph at page 3, lines 2 to 9 as follows:

--In any of the conventional approaches, the camera control module 204 requires an interpretation/execution unit for interpreting/executing a "camera-operation request" transmittted transmitted from a camera client, and a camera-operation-right arbitration unit for determining, when a plurality of camera clients simultaneously request to operate the same camera, for to which camera client the operation right for the camera is to be provided.--

Please amend the paragraph at page 3, lines 10 to 16 as follows:

--In ordinary conventional remote camera systems, a single camera control module usually operates a single camera. There exist conventional systems in which a

single camera control module controls a plurality of cameras. Even in such systems, however, only a single camera can ~~be~~ actually be operated, and it is impossible to operate other cameras simultaneously ~~operate other cameras~~.--

Please amend the paragraph at page 3, lines 17 to 23 as follows:

--It is possible to apparently operate a plurality of cameras by providing a plurality of camera control modules. In this case, however, each camera is independently operated by a dedicated module. Accordingly, it is difficult to cause a plurality of cameras to operate in cooperation with one another, or to be linked with one another ~~complementing~~ compensating for problems in other cameras.--

Please amend the paragraph at page 4, lines 3 to 7 as follows:

--It is an object of the present invention to provide a camera control system, a camera control method, a camera control server, a camera apparatus ~~or~~ and a user interface apparatus which ~~causes~~ can cause a plurality of cameras or camera servers to perform a linked or cooperative operation.--

Please amend the paragraph at page 4, lines 8 to 11 as follows:

--It is another object of the present invention to provide a linkage control server for causing a plurality of camera servers to perform ~~a linked~~ linked or cooperative operation ~~from~~ based on a plurality of camera clients.--

Please amend the paragraph from page 4, line 12 to page 5, line 6 as follows:

--According to one aspect of the present invention, a camera control system for controlling a linked operation of a plurality of cameras via a network includes camera setting means for setting a plurality of cameras connected to the network as cameras to be linked with one another, operation setting means for setting conditions and contents of a linked operation for each of the cameras set by the camera setting means, camera-state-information acquisition means for acquiring information relating to the state of at least one photographing parameter (such as of panning, tilting and zooming) states of the plurality of cameras set by the camera setting means, starting means for starting, when a camera satisfying the conditions of the linked operation set by the operation setting means is present based on the state information acquired by the camera-state-information acquisition means, the contents of the linked operation corresponding to the conditions of the linked operation set by the operation setting means, and output means for outputting a control command corresponding to the contents of the linked operation to at least one camera to be linked with the camera satisfying the set conditions.--

Please amend the paragraph from page 5, line 15 to page 6, line 1 as follows:

--According to another aspect of the present invention, a camera control method for controlling a linked operation of a plurality of cameras via a network includes a camera setting step of setting a plurality of cameras connected to the network as cameras to be linked with one another, an operation setting step of setting conditions and contents of a linked operation for each of the cameras set in the camera setting step, a camera-state-information acquiring step of acquiring information relating to the state of at least one of panning, tilting and zooming states photographing parameter of the plurality of cameras set

in the camera setting step, a starting step of starting, when a camera satisfying the conditions of the linked operation set in the operation setting step is present based on the state information acquired in the camera-state-information acquiring step, the contents of the linked operation corresponding to the conditions of the linked operation set in the operation setting step and an output step of outputting a control command corresponding to the contents of the linked operation to at least one camera to be linked with the camera satisfying the set conditions.--

Please amend the paragraph at page 6, lines 2 to 21 as follows:

--According to still another aspect of the present invention, a storage medium stores an operation processing program for controlling a linked operation of a plurality of cameras via a network. The program includes the processes of setting a plurality of cameras connected to the network as cameras to be linked with one another, setting conditions and contents of a linked operation for each of the set cameras, acquiring information relating to the state of at least one ~~of panning, tilting and zooming states~~ photographing parameter of the plurality of set cameras, starting, when a camera satisfying the set conditions of the linked operation is present based on the acquired state information, the contents of the linked operation corresponding to the set conditions of the linked operation, and outputting a control command corresponding to the contents of the linked operation to at least one camera to be linked with the camera satisfying the set conditions.--

Please amend the paragraph at page 8, lines 24 to 25 as follows:

--Preferred The preferred embodiments of the present invention will now be described with reference to the drawings.--

Please amend the paragraph at page 10, lines 7 to 10 as follows:

--In order to be able to utilize a plurality of cameras via the camera linkage control server 500, it is preferable that each of the camera clients on the computer network 302 provides a user interface such as that shown in FIG. 3.--

Please amend the paragraph from page 11, line 24 to page 12, line 6 as follows:

-- The camera linkage control server 500 includes a CPU (central processing unit) 508, a main memory 509, and a hard disk 510. Each software component is loaded from the hard disk 510 into the main memory 509, and is executed by the CPU 508. Each of the The camera server 400 and the camera client 600 each also includes include a CPU, a main memory, a hard disk, and the like. A video camera 420 for sensing images is provided in the camera server 400.--

Please amend the paragraph from page 12, line 22 to page 13, line 6 as follows:

--The operation-right control unit 413 provides one of a plurality of camera clients which have requested a camera operation with an operation right. In order to realize the operation-right control unit 413, for example, processing of providing a client which has first requested a camera operation with an operation right, and then providing a client which which has next requested a camera operation with an operation right is mounted used. Only a request for a camera operation transmitted from a client provided with an operation right may be transmitted to the camera operation unit 412.--

Please amend the paragraph at page 14, lines 1 to 19 as follows:

--A software module constituting the camera linkage control server application program 507 will now be described. The term “software module” indicates an internal functional unit of software. Usually, the a software module is mounted provided in the form of a group of functions, a class or an object in an object-oriented architecture, or the like. The camera control module 410 may be realized as a software module if appropriately mounted. Accordingly, unless particularly mentioned, a word the word “module” hereinafter indicates a “software module”. As shown in FIG. 4, the camera linkage control server application program 507 includes the following modules:

- a transmission/reception module 515,
- a CS control module 516,
- a CC control module 517,
- a camera-state control module 518,
- a camera linkage control module 519,
- a camera operation submodule 520, and
- an operation-right control submodule 521.--

Please amend the paragraph from page 18, line 23 to page 19, line 12 as follows:

--A camera-state control table controls states relating to a plurality of cameras. Information relating to the state of a specific camera is retrieved by using the “camera ID” as a key. The linkage control server 500 acquires the latest camera-state information by asking the camera control module of the camera server controlling the camera n. When the state (the image sensing direction or the operation right) of the camera

has been changed by the camera control module, the camera-information notification unit 414 within the camera control module 410 notifies the linkage control server 500 of the change. The camera-state information can be updated at any time based on this notification. The camera-state control table may be mounted in the form of a table similar to that for the CS control module, as shown in FIG. 7.--

Please amend the paragraph at page 20, lines 4 to 22 as follows:

--In the first embodiment, a plurality of camera clients can request a camera operation ~~to~~ by the same camera. Accordingly, when executing linkage processing, a case may arise in which a camera to be linked is already used in use by another client, and therefore the operation right can not be acquired. When conflict in the operation right occurs in the above-described manner, the operation-right control submodule 521 executes processing ~~of dissolving to resolve the~~ conflict based on the description within the camera-linkage-information control table. The processing of arbitrating conflict provided in the first embodiment includes the following action items. That is, when a request for a camera p which is already being used is provided,

- wait until the ~~operation~~ operation right is released,
- forcedly acquire an operation right for the camera p,
- acquire an operation right for an alternative camera (for example, a camera q), and
- give up an operation for the camera p.--

Please amend the paragraph from page 20, line 23 to page 21, line 10 as follows:

--The camera-linkage-information control table (FIG. 8) used by the linkage control module 519 can be formed using a user interface provided by the linkage control module 519, as shown in FIG. 9. Items which can be set on a window 501 531 (see FIG. 9) in the first embodiment are as follows:

- a camera list 532,
- an action list 533,
- an action name 534,
- starting conditions 535,
- cameras to be linked 536,
- processing during conflict 537,
- operation contents 538, and
- an alternative-camera flag 539.--

Please amend the paragraph from page 21, line 22 to page 22, line 14 as follows:

--The list of “linkage operations” set for the camera selected by the user (“camera I” in the case of FIG. 9) from the camera list displayed on the region 532 is displayed on the display region “action list” 533. The “linkage-movement”, i.e., action, set for each camera is stored in the “action list” in the camera-linkage-information control table. The “action list” in the camera-linkage-information control table is generated when a linkage operation is newly set. That is, when newly setting a “linkage movement”, i.e., i.e., an action, first, a target “camera ID” is selected on the “camera list” display region 532, and then the “action name” and the “starting conditions” to be set for the target camera are set in the regions 534 and 535, respectively. The “action name” is arbitrarily

provided for the linkage information by the user. In the case of FIG. 9, a name “image switching” is provided. The “action name” is also displayed on the action list 533. An arbitrary character string may be assigned for the value of the action name.--

Please amend the paragraph at page 24, lines 9 to 13 as follows:

--The camera linkage information formed on the user interface shown in FIG. 9 is stored in a main memory or a secondary storage device as text data including the following items, as shown in FIG. 8. In the following description, ~~a line starting from //~~ ~~indicates each line starting with //~~ is a note.--

Please amend the paragraph at page 29, lines 3 to 4 as follows:

--For the initialization of the camera state control module, a table as shown in FIG. 7 is formed.--

Please amend the paragraph at page 34, lines 3 to 16 as follows:

--The contents of the received camera-operation request are in a format so as to be interpreted and executed by the camera control module 410 substantially without being modified. However, since the “camera ID” assigned in the request is a “global camera ID”, the “camera ID” must be converted into a “local camera ID” for the camera control module 410. Accordingly, the CC control module 517 which has received the camera-operation request first extracts the “camera ID” (step S1303). This “camera ID” is a “global camera ID”. The CC control module 517 transmits this “camera ID” to the camera-state control module 518 to acquire the CS-ID of the camera control module 410 controlling the concerned camera (step S1304).--

Please amend the paragraph from page 37, line 15 to page 38, line 2 as follows:

--The camera-state control module 518 to which the notification of the camera operation has been transferred from the CS control module 516 extracts camera-state information, such as the “camera ID”, the “orientation” and the “zooming magnification” of the camera camere, and the like (step S1408). Then, the camera-state control module 518 updates camera-state information within the camera-state control table (see FIG. 7) based on the extracted information (step S1409). The camera-state control module 518 further extracts the value of the CC-ID item from the camera-state information (step S1410), transmits the CC-ID to the CC control module 517, and instructs the CC control module 517 to transfer the notification of the camera operation (step S1411).--

Please amend the paragraph at page 42, lines 5 to 19 as follows:

--When acquisition of an operation right has failed (step S1518), i.e., when the concerned camera is already used in use by another camera client 601, processing of resolving to resolve the conflict of the operation right assigned in the Policy item within the linkage control information is executed (step S1519). As described above, the items which can be assigned as Policy are:

- wait until the operation right is released
- forcedly acquire an operation right for the camera p,
- acquire an operation right for an alternative camera (for example, a camera q), and
- give up an operation for the camera p.

As described above, these items are set by means of the window dialog shown in FIG. 9.--

Please amend the paragraph at page 43, lines 9 to 20 as follows:

--On the other hand, when “forcedly acquire an operation right for the camera” has been selected as the processing for resolving conflict of the operation right, transmission of a request to acquire an operation right is again instructed to the transmission/reception module 515. However, at this request to acquire an operation right, a “forced-acquisition flag” is ~~made~~ put in an on-state. When the camera control module 410 does not support a forced-acquisition function, this resolving method is, of course, ineffective. When the forced-acquisition flag is supported and forced acquisition of an operation right has succeeded, the processing starting from step S1520 is resumed.--

Please amend the paragraph at page 52, lines 6 to 17 as follows:

--As described above, in the second embodiment, a data control mechanism is realized using a database control system, and components for camera linkage are incorporated in each ~~camera~~ camera control module. Hence, even if the number of cameras is increased or ~~decreased~~ decreased, it is possible to continue to operate the system only by operating camera information in the database. In addition, ~~since~~ the load of camera linkage processing is not concentrated in a specific computer, but is dispersed in each camera control module, and hence, module. ~~Hence,~~ the efficiency in utilization of the entire system is improved ~~than in~~ over the first embodiment.--

Please amend the paragraph from page 52, line 24 to page 53, line 2 as follows:

--In such a case, the program codes themselves read from the storage medium realize the functions of the above-described embodiments, so that the storage medium storing the program codes constitutes one aspect of the present invention.--